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# Impact of Curiosity-Based Reading on Summary Writing in Sri Lankan ESL Universities

Ruwan Gunawardane[1]
University of New England
Australia
University of Ruhuna
Sri Lanka

Joshua Matthews
University of New England
Australia

**Abstract**

This study examined Sri Lankan English as a Second Language (ESL) undergraduate learners' reading-to-write task performance over six weeks. The Experimental Group (EG; $n = 33$) read and summarized articles rated as curious on a Likert scale measuring curiosity, while the Control Group (CG; $n = 31$) read articles rated as incurious (low-curiosity end of the scale). A pre-test and post-test were used to assess participants' summary writing performance across five rubric dimensions. A combined measure of all dimensions showed that both groups improved significantly; however, the difference in gain scores between the EG and CG was not statistically significant, despite a small to medium effect size favouring the treatment group. However, an analysis of the individual dimensions revealed that the EG significantly outperformed the CG in the *Overall Quality* dimension, with a medium-to-large effect size. Results speak to the potential of curiosity in ESL instruction.

***Keywords:*** curiosity, intrinsic motivation, reading-to-write tasks, ESL, university students, Sri Lanka

The poor English language proficiency of Sri Lankan undergraduates is a recurring national concern, contributing to a range of academic and socio-economic challenges. There is an ongoing debate within the Sri Lankan research community regarding the underlying reasons for students' failure to attain adequate proficiency in English: language anxiety (Weerakoon, 2024), poor knowledge of English at university entrance (Abeysena & Abeywickrama, 2020; Prasangani & Nadaranjan, 2016), poor-quality lesson materials and an outdated ESL curriculum (Attanayake, 2017; Savarimuttu, 2019), limited time and resources (Siriwardhana, 2022), and university subculture (Chandradasa, 2015). In addition, a significant cause of this systemic issue is the lack of intrinsic motivation among this elite cohort of students to learn English (Senarathne

[1] Corresponding author

& Abeywickrama, 2024), despite the undergraduates knowing the importance of the target language both for studies and employment (Gunawardane, 2018). Noted inadequate levels of English language proficiency among Sri Lankan undergraduates have been associated with low graduate employability (Dayaratna-Banda & Dharmadasa, 2022; Wijewardene et al., 2014) and poor academic performance (Perera, 2014), and as such, the problem demands a robust solution. However, most previous related research has primarily focused on highlighting the problem, rather than interrogating the efficacy of innovative approaches that may hold the potential to resolve it.

Facilitating effective large-scale second language learning is a challenging and sometimes perplexing proposition (Ellis, 1994), and the relative lack of success of English language programs in the Sri Lankan university context is a key example. These undergraduates are the most academically gifted cohort of the country, with only a tiny fraction of the total student population granted the opportunity to enter university every year based on their previous academic performances. For instance, university entrance is so competitive that though 166,938 students (63.25%) (out of 263,933 Advanced Level candidates) were qualified for university entrance in 2022, only 43,568 (25.39%) were admitted to the national university system for the academic year 2021/22 (National Human Resources Development Council in Sri Lanka, 2023). Further, these undergraduates are taught English by the most qualified teachers of the country (Gunawardane, 2018). Why, then, do these students struggle to achieve adequate levels of English language proficiency by the end of their tertiary studies? Arguably, part of the problem is that English at university for Sri Lankan undergraduates has been in large part fostered through instrumental motivation (Kumarage, 2016)—that which fundamentally fulfils a requirement or practical outcome (Dörnyei, 2001; Noels et al., 2000; Oxford & Shearin,1994). In evidence of this is the poor attendance of undergraduates at English lessons, except when attendance is mandatory as a requirement for eligibility to sit for General English exams (Gunawardane, 2018; Senarathne & Abeywickrama, 2024).

This Sri Lankan university ESL context bears the characteristics of an atmosphere where learners prioritize instrumental motivation and are more extrinsically motivated rather than intrinsically motivated to learn English. However, when extrinsic motivation holds primacy in an educational context, the influence of intrinsic motivation is likely to be less salient (Deci et al., 2001; Ryan & Deci, 2000). The English language learning pressures placed on undergraduates are also conflicting. On the one hand, they are expected to reach high levels of second language proficiency, a process known to be most effectively driven by intrinsic motivation. On the other hand, students must engage in the challenge of second language acquisition within an education system where extrinsic values predominate. This emphasis may undermine learner autonomy and diminish intrinsic motivation, which is crucial for sustained language learning (Ryan & Deci, 2000). Therefore, more research is needed to develop new pedagogical approaches that adequately enhance intrinsic motivation among learners within the under-researched Sri Lankan ESL context. The present study is inspired by the proposition that curiosity—a manifestation of intrinsic motivation (Ciampa, 2014, 2016) that makes learning intrinsically rewarding and highly enjoyable (Kashdan et al., 2004)—can be strategically leveraged to promote the efficacy of the language learning process (Mahmoodzadeh & Khajavy, 2019; Nakamura et al., 2022). The overarching objective of the current study is to cast light on the potential of the construct of curiosity in ESL contexts and thereby inspire future related research within Sri Lanka and beyond.

## Literature Review

Curiosity, as a mental state, has played a pivotal role in the evolution of human civilization, yet its precise nature remains a subject of debate. A survey of related literature suggests four key theoretical perspectives that have sought to define the nature of curiosity, with each theory contributing unique perspectives and distinct implications (see Table 1).

Table 1. *Theorization of Curiosity: Theorists, Theory, and Definition*

| Theorists | Theory/model | Description/theory |
|---|---|---|
| Berlyne (1954) | Drive | Curiosity is a human drive, comparable to hunger/thirst. |
| Hebb (1958), Piaget (1969), and Hunt (1963) | Incongruity | Curiosity arises due to incongruity between something (an event, object, etc.) and a person's existing world view. |
| Loewenstein (1994) | Information-gap | Curiosity arises when someone becomes aware of a gap between his knowledge and some other desired information. |
| Dubey and Griffiths (2020) | Rational | Curiosity arises when people perceive an opportunity to increase the value of their knowledge. |

Before settling on the information-gap theory as the primary framework for this study, we briefly critique several of the prominent theories of curiosity to provide a broad context. Curiosity, when conceptualized primarily as a form of physiological arousal (Berlyne, 1954), arguably fails to capture its deeper cognitive, motivational, and long-term learning dimensions. Reducing curiosity to a biological drive risk overlooking its complexity, including the intrinsic motivational values it embodies (Loewenstein, 1994), the cognitive motivations and enjoyment associated with the learning process (Litman, 2005), and the role of cognitive appraisal in sustaining intrinsic motivation (Silvia, 2006). Incongruity theory suggests that curiosity is sparked when an individual's worldview is challenged or disrupted (Hebb, 1958; Hunt, 1963; Piaget, 1969). However, this narrow focus may not fully account for curiosity as a broader motivational process that involves sustained traits like interest, engagement, and motivation (Silvia & Kashdan, 2021) or the dynamic interplay of emotions and learning goals (Hidi & Renninger, 2006). The rational model, in contrast, emphasizes curiosity as a response to topics that increase understanding or perceived usefulness (Dubey & Griffiths, 2020). Among these theories, the information-gap theory (Loewenstein, 1994) stands out as one of the most compelling and influential. This theory describes curiosity as "a cognitive-induced deprivation that arises from the perception of a gap in knowledge and understanding" (Loewenstein, 1994, p. 76). The desire to close this gap drives individuals to seek out the missing information, thereby resolving inconsistencies in their knowledge. As this definition of curiosity is intuitively appealing and most consistent with everyday discourse (Kidd & Hayden, 2015), it is applied in the current study.

Loewenstein's definition of curiosity provides a useful reference point for pedagogical approaches that seek to harness this construct. Moreover, it provides an avenue to conceptualize

curiosity within the framework of specific second language learning pedagogical theories and concepts. For example, the theoretical underpinnings of curiosity-driven reading-to-write tasks can be aligned with reading, sociocultural theories, and the input/output hypotheses, all of which hold direct relevance to the mainstream ESL theoretical landscape. For instance, cognitive psychology's top-down theory of reading posits that text comprehension is enhanced when readers activate prior knowledge frameworks (schemas) that connect new information to familiar concepts (Carrell & Eisterhold, 1983; Pearson et al., 1984). This situation emphasizes the importance of closely aligning language learning tasks to learner preferences. Such close alignment of reading-to-write tasks to the context and its learners in question to enhance learner motivation is also consistent with the sociocultural theory (Vygotsky, 1978) and the concept that motivation is contextually situated (Walker et al., 2004). The information-gap theory of curiosity (Loewenstein, 1994)—grounded in motivational psychology and with relevance to the top-down theory of reading—postulates that curiosity is the desire to fill a gap in knowledge, driving an individual to explore information, primarily facilitating learning. Curiosity-based reading is also justified by the input hypothesis (Krashen, 1985) that emphasizes the importance of a sufficient amount of meaningful, relevant, and interesting comprehensible input for language acquisition. The output hypothesis emphasizes that language acquisition/learning may occur either through producing written or oral language, enabling learners to test hypotheses about the target language, modify them where necessary, and use their linguistic resources meaningfully (Swain, 1993).

*Reading-to-Write Tasks and Summary Writing*

The integration of reading and writing (reading-to-write) tasks as an instructional method in second language (L2) classrooms has been identified to enhance both reading comprehension and writing proficiency (Graham, 2020; Hirvela, 2016; Plakans, 2008; Warschauer et al., 2013). Such a combination of reading and writing tasks facilitates learners in processing information more deeply while reinforcing vocabulary, grammar, and discourse patterns exposed to in reading texts (Grabe & Zhang, 2013). A comparative multiple case study with six distinct participants conducted at a Thai university reported that the reading-to-write approach fostered the use of more complex grammar structures, compared to the writing-only approach (Tatsanajamsuk, 2024). Another study conducted at a Korean university involving 43 undergraduates performing integrated reading-to-write tasks found that learner L2 proficiency was positively related to reading-to-write strategies (Cho & Lee, 2016). Further, with two groups of secondary school learners ($n$ = 258; $n$ = 470) in China, Ye and Ren (2023) make clear that reading informs and shapes writing performance. Moreover, this reading-to-write pedagogical synergy has gained popularity for assessing both skills as well, with reading-to-write tasks increasingly used in high-standard testing contexts (Shin & Ewert, 2015; Weigle, 2004).

The incorporation of summary writing within L2 reading-to-write pedagogy has attracted attention because it combines both reading and writing as a learning tool (Fitzgerald & Shanahan, 2000; Li et al., 2024), allowing educators to assess various L2 competencies simultaneously (Qin & Groombridge, 2023). Producing output, such as writing summaries, encourages learners to process input more meaningfully as postulated in Swain's (1985) Output Hypothesis. Research in L2 contexts demonstrates that summary writing not only helps learners paraphrase information using their own linguistic resources but also enhances reading comprehension (Gao, 2017). A six-month-long quasi-experimental study conducted at a Polish

national university with 80 undergraduates reported that summarising has a positive impact on reading development, being highly beneficial for weaker readers (Marzec-Stawiarska, 2016). Another study with 60 undergraduate learners in an Algerian university context indicated that there was a positive correlation between summary writing performance and reading comprehension (Mokeddem & Houcine, 2016). A study conducted in a Malaysian university context with 53 ESL students investigated a newly developed theory—based summary writing online tool (Summary Writing-Pal—SW-PAL). The results indicated that summary writing performance improved significantly in association with the use of the SW-PAL tool, with a large effect size (Chew et al., 2020). Thus, previous research validates the pedagogical value of the incorporation of summary writing into L2 instruction.

### *Curiosity in ESL Contexts*

The application of the construct of curiosity in educational contexts is supported by research showing its benefits in facilitating learning (Grossnickle, 2016; Jepma et al., 2012; Loewenstein, 1994), memory retention (Gruber et al., 2014; Gruber & Ranganath, 2019; Kang et al., 2009), and intrinsic motivation (Deci & Ryan, 1985; Freeman et al., 2014; Ryan & Deci, 2000; Silvia, 2006). Despite extensive research highlighting curiosity as a powerful driver of learning, its application in language learning contexts remains underexplored, with only a handful of studies having rigorously explored the construct. For example, Sun Joo and Lee Jin (2024) undertook a study among 27 South Korean undergraduates to investigate how the use of video-based virtual reality influenced students' creativity and curiosity in Project-Based Language Learning (PBLL). The findings revealed that the approach had a positive impact on enhancing students' creativity and curiosity. A classroom-based study at a Thai university involving 25 English language undergraduates identified factors that foster epistemic curiosity and suggested curiosity-driven teaching strategies for language classrooms (Nakamura et al., 2022). For example, *positive appraisal* as a precursor reports learners becoming curious about self-relevant learning content. In an effort to conceptualize curiosity in the Iranian ESL context, Mahmoodzadeh and Khajavy (2019) categorized the antecedents of language learning curiosity as those that were *self-related*, *teacher-related*, and *peer-related*. For instance, *self-related* antecedents of curiosity to learn English were identified to emanate from within the learner and were characterized as a learner's self-determined orientation towards learning L2 grammar, vocabulary, and language skills. Another study carried out at a national university in Sri Lanka with 182 undergraduate ESL learners reported upon six textual themes of highest levels of curiosity in reading associated with undergraduate learners: *Universe and Astronomy, Speculations, Science and Technology, Psychology, Lifestyle, and Current Political/Social Issues,* respectively (Gunawardane et al., in press). The researchers present a relatively accessible model for the selection of potentially curiosity-inspiring reading materials that could enhance intrinsic motivation to learn English. These studies reveal that employing curiosity research in ESL is still in its early stages, with a notable lack of studies focused on the four core language skills and no quasi-experimental designs applied to date.

## The Current Study

Despite its potential, the lack of research on fostering curiosity-driven learning opportunities for ESL learners is evident and calls for further studies to guide its application in language classrooms. The current study aims to address this gap, focusing on the systemic lack of intrinsic

motivation among Sri Lankan university undergraduates, which impedes English learning (Gunawardane et al., 2021; Kumarage, 2016; Senarathne & Abeywickrama, 2024). This study will employ a quasi-experimental design with pre-test and post-test phases to evaluate the effectiveness of a pedagogical intervention. Learners in the Experimental Group (EG) will read texts they have rated as inspiring curiosity on a Likert scale, whereas learners in the Control Group (CG) read texts they have rated as incurious, placing them at the low-curiosity end of the scale. Learners will then produce written summaries, enabling a comparison of the impact of curiosity on any measurable differences in summary writing performance. Previous research shows a strong link between reading and curiosity, indicating that curiosity-driven reading enhances engagement and reading competence (Guthrie & Wigfield, 1999; Schiefele, 1999). Curiosity is a significant factor in reading motivation and learner engagement, contributing positively to reading enjoyment and competence (Schiefele et al., 2012; Watkins & Young Coffey, 2004). Curiosity also facilitates learning by preparing the brain for enjoyment and better retention (Gruber et al., 2014). This study hypothesizes that curiosity-driven reading can be an effective input for ESL learners, leading to measurable improvements in writing performance outcomes. Given that no prior research has specifically examined the impact of curiosity on any of the four English language macro-skills in-depth, this study will fill this gap by investigating how curiosity may influence learners' reading-to-write performance through a targeted pedagogical intervention. The following research question will be addressed:

RQ: What is the effect of curiosity-based reading on the development of summary writing in English?

## Methods

### *Participants*

Participants for the current study were drawn from a representative group of 182 science undergraduate ESL learners from a national Sri Lankan university involved in a larger related study (Gunawardane et al., in press). We sought to establish a subgroup of participants with English language proficiency in the 'peak of the bell curve' distribution for the entire cohort. The objective here was to establish a group of learners with relatively homogeneous English language proficiency through the exclusion of those participants with relatively low and relatively high English language proficiency. This was achieved based on the placement test results provided by the Department of English Language Teaching (DELT) of the institution, which is undertaken by all students in the faculty. The mean score for the cohort was established (17/25), and then the interval above and below this mean score was increased until an adequate sample size was established ($n$ = 66, 15 males, 51 females; with a test score between 15 and 19). Once established, members of this relatively homogenous group were randomly allocated to either an EG or a CG through the affordances of a high-quality online random number generator (i.e., https://www.random.org/integers/). Both placement test and pre-test scores obtained by the participants of each group underwent two separate independent samples $t$-tests to further ensure baseline comparability between the two groups. The placement test results indicated no significant statistical difference between the EG ($M$ = 17.12, $SD$ = 1.34) and the CG ($M$ = 16.77, $SD$ = 1.63), $t(58.26) = 0.93$, $p = .36$, $d = 0.23$. Similarly, the pre-test results also revealed no significant difference between the EG ($M$ = 15.55, $SD$ = 5.52) and the CG ($M$ = 16.74, $SD$ = 7.75), $t(53.96) = -0.71$, $p = .48$, $d = -0.18$. This confirmed that participants from the two groups

were comparable in terms of initial English proficiency, as evidenced by both a general proficiency measure and a task-specific measure directly aligned with the methods of the current study. Due to attrition, two male students withdrew from the CG just before the commencement of the intervention, resulting in a total sample size of the current study of 64 (EG, $n = 33$; CG, $n = 31$), leading to a change in gender distribution ($n = 64$, 13 males, 51 females).

To provide a broad background for this under-researched context, Sri Lankan students typically receive 13 years of English instruction before entering university, usually at age 20 (Aloysius, 2015). The University Test of English Language (UTEL) benchmark, which is aligned with the Common European Framework of Reference (CEFR) for languages (Council of Europe, 2020), is the common yardstick proposed in Sri Lankan higher education to assess English proficiency. Undergraduates are expected to achieve UTEL Level 3 (B1, Intermediate) upon university entry and aim for UTEL Level 5 (C1, Advanced) by graduation. Independent assessment by the lead author of the current research cohort indicated participants' English proficiency at approximately B1 (Intermediate). The research received ethical clearance from the affiliated human research ethics committees (#HE23-069), including approval from the cooperating institution in Sri Lanka. The study met the requirements stipulated in the National Statement on Ethical Conduct in Human Research (Australia).

*Selection of Texts*

The texts used for the pre-test, the post-test, and the intervention in the current study are drawn from a pool of 90 news articles (Supplementary 1) based on themes identified as inspiring curiosity to read among learners in the Sri Lankan university context (Gunawardane et al., in press). The articles were selected using the Common Core State Standards (CCSS) model, dividing text complexity into qualitative dimensions, quantitative dimensions, and reader-task considerations (Hiebert & Pearson, 2014). All steps in selecting texts were facilitated by the lead author, who has had twenty years of professional experience in the research context. Text selection was based on meaning, structure, language, and knowledge demands, and used the ***Lexile*® Text Analyzer**, provided by MetaMetrics®, to measure quantitative aspects like sentence length and word frequency, ensuring texts fell between 1200L and 1400L[2]. The lead author explicitly states that it is the researcher himself, not trained MetaMetrics® staff, who prepared the texts for submission to the Text Analyzer. As part of a larger study, six students from the same science first-year batch piloted different Lexile ranges, confirming 1200L-1400L as suitable. Finally, texts that were deemed appropriate for the target cohort were identified from 30 online news sources like BBC, CNN, and The Guardian. These were aligned with student curiosity through thematic keywords. To finalize the pool of 90 articles, the researcher reviewed approximately 200 texts and their Lexile measures.

*Test Instruments: Pre-test and Post-test*

The data collection instruments consisted of a pre-test and a post-test, administered one week before and after the six-week intervention. For each test, all 64 participants from the EG and CG

[2] The Lexile® Text Analyzer is a software program that evaluates and measures the complexity of a text by studying sentence length and word frequency. A Lexile text measure, denoted by "L", is a standardized metric that indicates the text complexity along with the word count, mean sentence length, and mean log frequency; it represents the syntactic and semantic challenges that the text presents to a reader.

were required to write two summaries based on two different news articles. The basic attributes of the texts used in the tests are provided (Table 2). For the pre-test, participants read and summarized Articles A and B, with respective Lexile measures of 1200L and 1280L; they produced a 6-to-8 sentence-long summary of about 100 words on each text, following the required generic framework (Table 3) for the reading-to-write task. In order to conduct a fair test for both EG and CG, two articles for the test that were of an average level of curiosity were selected (e.g., *neither curious nor incurious*). Accordingly, Articles A and B were selected for the test. For the post-test, Article B was replaced with Article C, with a Lexile level of 1310L, to avoid repetition, while Article A was used again to procure a true test-retest metric. However, Articles B and C were similar in terms of the topic (see Table 2 above), and the Lexile levels are also relatively standard (1280L and 1310L) and within the appropriate level (1200L–1400L). Article C, which Article B was replaced with, was not in the initial pool of 90 news articles and was introduced as part of the post-test requirements. The duration of each test was one hour and 20 minutes, and all the participants of both EG and CG completed the task in a classroom setting.

Table 2. *Texts Used for the Pre-test and the Post-test*

| Article | Pre-test | Post-test | Lexile | Mean sentence length | Mean log word frequency | Word count |
|---|---|---|---|---|---|---|
| **A.** Wildlife poop is the climate solution you've never heard of | ✓ | ✓ | 1200L | 17.22 | 3.11 | 792 |
| **B.** Thousands of UK young people caught watching online child abuse images | ✓ | | 1280L | 18.83 | 3.21 | 904 |
| **C.** How can children in the UK be protected from seeing online pornography? | | ✓ | 1310L | 19.43 | 3.06 | 991 |

*Intervention Tasks*

The intervention started a week after the pre-test and involved the EG and CG participants reading the news articles and writing summaries on them for a period of six weeks. In this intervention, learners in the EG engaged with texts they had rated as inspiring curiosity on a Likert scale, reflecting their perceived knowledge gaps and desire for information from the texts, whereas learners in the CG engaged with texts they had rated as incurious, placing them at the low-curiosity end of the scale. These ratings were based on participants' subjective evaluations of the text titles with short captions to generate curiosity, aligning with Loewenstein's (1994) definition, which contends that curiosity arises from an individual's recognition of knowledge gaps and the motivation to resolve them. The participants were required to follow the generic framework (Table 3) in every phase of the current study (pre-test, intervention, and post-test) while writing brief summaries in about 100 words (in 6 to 8 sentences). This standard framework

for written summaries ensured the validity and fairness of the tests. That is, the participants were required to read approximately 3000 words that were categorized between 1200L and 1400L and produce 3 summaries of about 300 words per week, spending about two hours per week engaged in the process. Accordingly, each individual participant, based on their own preference (*curious or incurious*), read a unique set of 18 news articles for the period of six weeks and wrote summaries on each article, with 3 summaries being produced per week. Altogether, participants from both groups produced 1,152 summaries.

Table 3. *The Framework of One Paragraph Summary for Pre-test, Intervention, and Post-test*

| Components | Composition | No. of sentences |
|---|---|---|
| Introduction | Overall main idea of the whole article | 1 or 2 |
| Body | Key point 1 | 1 or 2 |
| | Key point 2 | 1 or 2 |
| | Key point 3 | 1 or 2 |
| Conclusion | Summary (underlying meaning) of the article | 1 |

Feedback on participants' writing was provided every week by marking one of the three summaries produced by each participant. This was done to ensure that participants from both groups had a fair opportunity to improve their summary writing performance, enabling them to minimize errors in the writing process. The following table (Table 4) provides an overview of the intervention of the current study.

Table 4. *An Overview of the Conditions of the Intervention, Pre-test, and Post-test*

| Group | Dimension | Selection of articles | Degree of complexity | Pre-test | Intervention | Post-test |
|---|---|---|---|---|---|---|
| EG | Curious | By participants | Similar (1200L–1400L) | A reading-to-write task (two summaries) | A reading-to-write task (input + output; three summaries per week) | A reading-to-write task (two summaries) |
| CG | Incurious | By participants | Similar (1200L–1400L) | A reading-to-write task (two summaries) | A reading-to-write task (input + output; three summaries per week) | A reading-to-write task (two summaries) |

*Note*. EG = Experimental Group (reading curious texts), CG = Control Group (reading incurious texts)

*Assessment of Written Responses*

The written summaries ($n$ = 256) from pre- and post-tests were evaluated using a five-dimensional scoring rubric for integrated reading-to-write tasks, developed by members of the authorship team (Supplementary 2). The rubric, adapted from Yamanishi et al. (2019), includes

five dimensions: content, paraphrase (quantity), paraphrase (quality), language use, and overall quality, assessed on a 6-level scale: *excellent* = 5; *very good* = 4; *good* = 3; *fair* = 2; *poor* = 1 and *very poor* = 0. Accordingly, the maximum possible score that a summary can receive is 25. The assessment process involved a pilot marking stage in which the lead author initially marked 12 pre-test summaries. These were then assessed by two evaluators, who later met with the lead author to address discrepancies and further refine the rubric for validity. Systematic inter-rater discourse is an effective means of fostering rater reflexivity and a collective approach to assessing written texts (Matthews, 2023). The evaluators, with postgraduate qualifications and extensive ESL teaching experience in Sri Lanka, independently marked all 256 summaries and equally contributed to refining the rubric.

*Analysis*

To evaluate the effect of the intervention on summary writing performance, a pre-test–post-test design was employed with an EG and a CG. The dependent variable, summary writing score, was assessed by two independent raters using an analytical rubric (Supplementary 2), which allowed for a detailed evaluation under five dimensions of writing quality: content, paraphrase (quantity), paraphrase (quality), language use, and overall quality. The results were analyzed using an independent samples *t*-test and a paired samples *t*-test. The *t*-tests were conducted to examine if there were statistically significant differences in the mean scores of the pre-test and post-test results between and within the treatment and CGs following the six-week intervention. Additionally, five separate independent samples *t*-test analyses based on gain scores were also performed to understand learner performance across each of the five rubric dimensions. Both raters' Cronbach's Alpha values demonstrated an excellent level of measurement reliability, with high internal consistency (Cronbach's Alpha > 0.9). The intraclass correlation coefficients between the two raters were above 0.90, indicating excellent inter-rater reliability. This confirmation ensured the robustness of the rubric and the credibility of the findings. Given the equivalence in internal consistency, the scores from the more senior and experienced rater (Rater 1) were selected as the criterion for the present analysis. Prior to conducting the *t*-tests, normality and homogeneity of variance of the data were tested and confirmed. The statistical analysis was performed using IBM SPSS Statistics version 29.

*Procedure*

Prior to the pre-test, the lead author explained the task description (Supplementary 3) to the participants in a classroom session, using a sample summary on a news article to make explicit the expectations around summary writing tasks. This was conducted to familiarize the participants with the general framework (Table 3) of summary writing required for the study. Participants were encouraged to include an introduction, body, and conclusion in the short summary to maintain the uniformity and consistency of summaries produced during the pre-test, intervention, and post-test. As part of a larger study, each individual participant recorded their own preference by responding to each of the 90 articles in the pool along a 7-point Likert scale ranging from *most incurious* = 1 to *most curious* = 7, thereby identifying relevant reading texts for this reading-to-write program. That is, each participant's personal preferences were individually categorized on the curious end of the scale (*most curious, curious, and somewhat curious)*, or on the *incurious* end of the scale (*most incurious, incurious, and somewhat incurious).* Participants were then assigned articles to read and summarize based on their

individually selected preferences from this pool. For instance, each of the 64 participants of the EG and the CG had a unique set of 18 articles allocated to them for the reading-to-write tasks of the intervention. During the article selection process in the larger study, students evaluated article titles alongside captions summarizing their content. In line with Loewenstein's (1994) definition, curiosity arises from an individual's perception of knowledge gaps, which drives them to seek information to fill those gaps. In this context, participants' curiosity ratings reflected their desire to engage with the articles based on their perceived need to resolve uncertainties in their understanding. Accordingly, 'curious' articles were those that learners indicated a desire to explore further, rating them at the high-curiosity end of the Likert scale. Conversely, 'incurious' texts were those that learners did not find stimulating enough to explore further, rating them at the low-curiosity end of the Likert scale. This individualized text selection process ensured that the texts assigned to both the treatment and CG participants were demonstrably aligned with each participant's own curiosity preferences. By matching the intervention texts with participants' self-identified levels of curiosity or lack thereof, the study sought to provide content that genuinely reflected each individual's personal curiosity inclinations. This approach acknowledges that the construct of curiosity is inherently subjective, ensuring that the intervention was tailored to the unique curiosity profile of each participant.

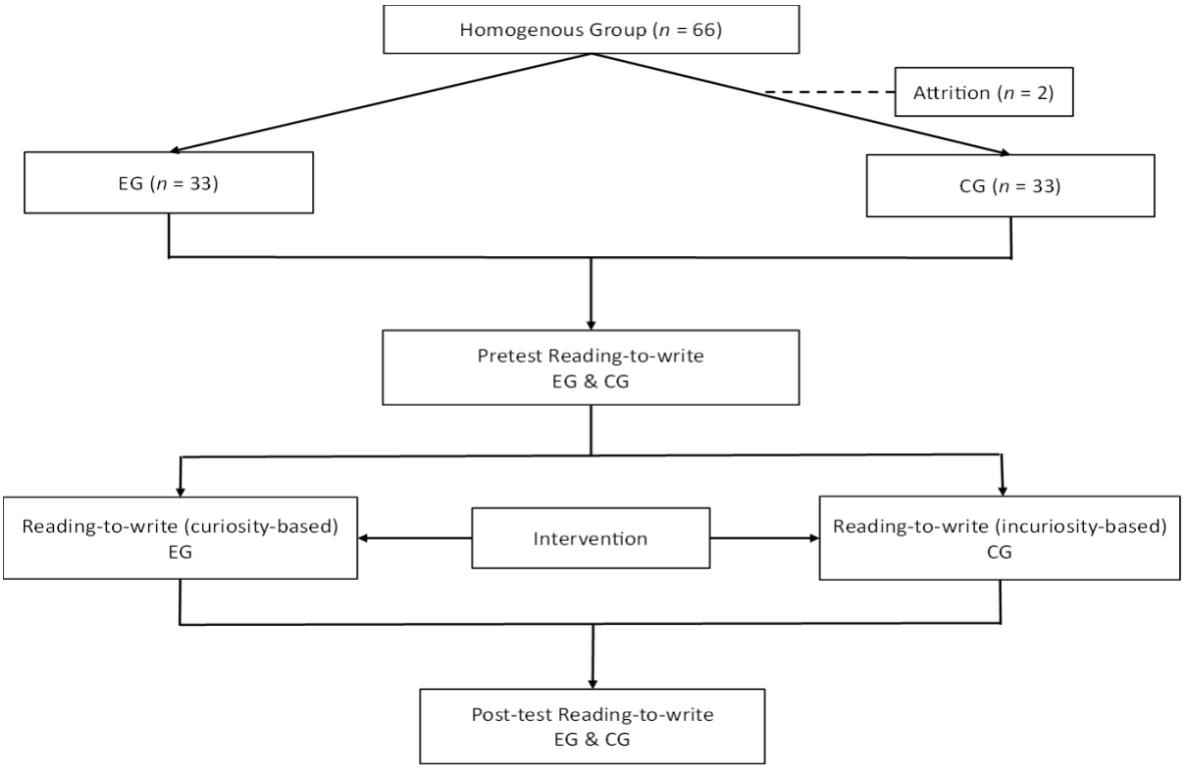


**Figure 1**. Quasi-Experimental Design of the Reading-to-Write Programme

The pre-test and the post-test were conducted under the standard formal exam conditions of the cooperating university. During the intervention, the students were given the opportunity to either undertake the summary tasks in the classroom arranged for them or to undertake the tasks outside the classroom. Regardless of where participants undertook the summary tasks, the completed summaries were submitted to the lead author, who facilitated the intervention. The

hard copies of the news articles and the printed writing template were also provided to the participants. Figure 1 depicts the overarching procedure of the current study.

## Results

The current study analysed gain scores from one independent rater (Rater 1) and applied an independent samples *t*-test and a paired samples *t*-test to evaluate the effectiveness of the 6-week-long intervention between and within the experimental and CGs. The descriptive statistics for the EG and the CG generated for Rater 1 are presented in Table 5.

Table 5. *Descriptive Statistics*

| Group | Mean (pre-test) | Max. score | Min. score | *SD* | Mean (post-test) | Max. score | Min. score | *SD* | Mean (gains score) | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|
| EG | 15.55 | 27 | 9 | 6.56 | 23.36 | 31 | 17 | 4.96 | 7.81 | 7.12 |
| CG | 16.74 | 33 | 9 | 8.53 | 22.19 | 32 | 11 | 6.37 | 5.45 | 7.39 |

*Note*. EG = Experimental Group, CG = Control Group, $N = 64$ (EG = 33, CG = 31)

The descriptive statistics generated for Rater 1 indicate that the CG at the pre-test had higher mean scores ($M = 16.74$) compared to the EG ($M = 15.55$), whereas the EG at the post-test shows higher mean scores ($M = 23.36$) than the CG ($M = 22.19$). The mean values of the gain scores indicate a higher improvement of the EG ($M = 7.81$) than those of the CG ($M = 5.45$), with a mean difference of 2.36. Similar standard deviations are observed for the EG and the CG, which indicates comparable variability and precision in the ratings.

The gain scores from Rater 1 underwent an independent samples *t*-test. With the assumption of equal variances met ($p > 0.05$), the Levene's test was ($F = 0.03$, $p = 0.86$). The *t*-test results ($t(62) = 1.30$, $p = 0.20$, two-tailed) showed no statistically significant difference between the treatment and CGs. The mean difference was calculated as 2.36 ($SE = 1.81$), indicating that the EG performed better on average than the CG, with a 95% confidence interval ranging from -1.26 to 5.99. An effect size of Cohen's $d = 0.326$ was also observed, suggesting a small to medium practical effect.

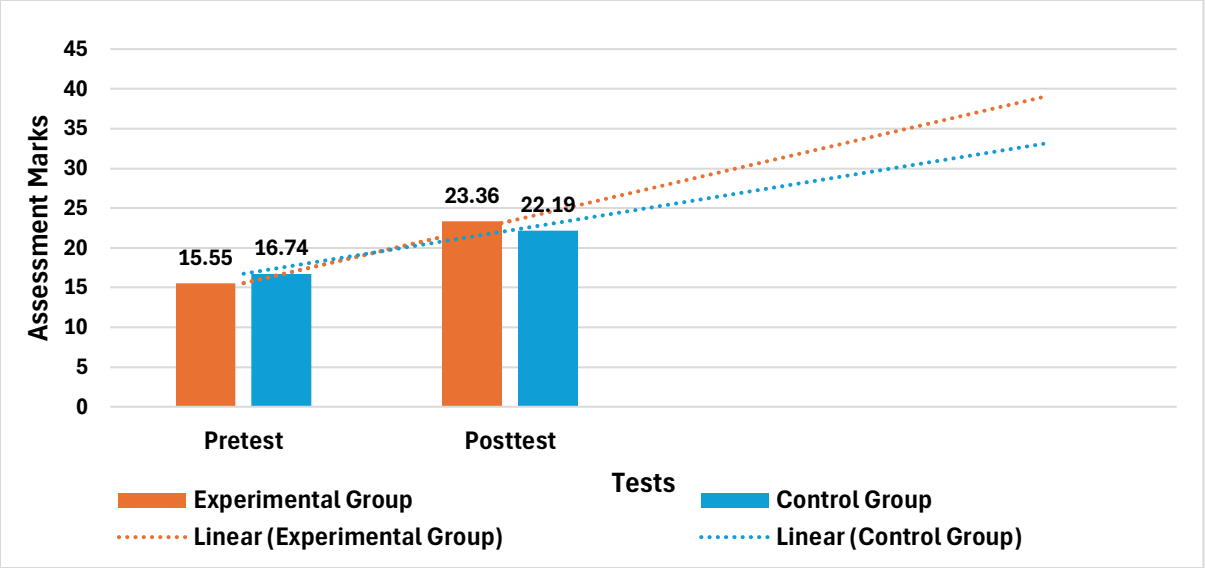


**Figure 2**. Mean Scores for Control and Experimental Groups at Pre-test and Post-test

The bar graph above (Figure 2) visually presents the improvement of both the treatment group and the CG at the pre-test and the post-test. The linear forecast trendlines indicate the positive trend observed in the study, with its likely improvement into the future. Although the observed difference was not statistically significant, the larger magnitude of improvement of the EG when compared to that of the CG, with a small to medium effect size, speaks to the potential usefulness of curiosity in the Sri Lankan ESL context.

Given the improvement within the groups, a paired samples *t*-test indicates that both the EG and the CG groups improved with a statistical significance ($p < .001$) (Table 6), with the EG exposed to the curious texts outperforming the CG in the post-test with a higher mean score (EG = 23.36, CG = 22.19). The EG's higher gain score (EG = 7.81, SD = 7.12; CG = 5.45, SD = 7.39) is arguably suggestive that the curiosity-based intervention had a stronger impact on their performance compared to the CG.

Table 6. *Descriptive and Inferential Statistics for Pre-test, Post-test, and Gain Scores by Group*

| Group | Mean (pre-test) | Mean (post-test) | Gains score | Sig. | SD |
|---|---|---|---|---|---|
| EG | 15.55 | 23.36 | 7.81 | 0.001 | 7.12 |
| CG | 16.74 | 22.19 | 5.45 | 0.001 | 7.39 |

Table 7 further illustrates how the EG and the CG performed at the pre-test and the post-test in relation to the news articles they produced summaries for. Article A was administered at both the pre-test and the post-test (test-retest scenario; 'seen' text) while Article B was replaced with Article C at the post-test (transfer test scenario; 'unseen' text) (See Table 2 also). Both the EG and the CG demonstrated significant improvements in both scenarios, with the EG indicating higher gain scores (4.6), particularly when responding to the unseen text (Article C), which suggests enhanced generalizability of skills participants acquired through the curiosity-based approach in the intervention. The overarching impression is that the treatment was similarly effective for both groups, with relatively similar effect sizes, and the intervention is probably

inherently useful compared to the baseline approach to reading and writing typical of the research context.

Table 7. *Group-Level Pre-test, Post-test, and Gain Scores for Articles A and B/C with Statistical Comparison*

| | Pre-test: Article A | Post-test: Article A | Gains score | Sig. | Effect size (Cohen's *d*) | Pre-test: Article B | Post-test: Article C | Gains score | Sig. | Effect size (Cohen's *d*) |
|---|---|---|---|---|---|---|---|---|---|---|
| EG | 7.76 | 10.97 | 3.21 | 0.001 | 4.03 | 7.79 | 12.39 | 4.6 | 0.001 | 3.85 |
| CG | 8.55 | 11 | 2.45 | 0.001 | 4.13 | 8.19 | 11.19 | 3 | 0.001 | 4.68 |

Table 8 demonstrates five separate independent samples *t*-test results based on gain scores that help understand learner performance across five rubric dimensions (i.e., content, paraphrase (quantity), paraphrase (quality), language use, overall quality). The analysis indicated that the EG ($M = 1.79$) outperformed the CG ($M = 0.77$) in *Overall Quality*, demonstrating a statistically significant improvement, $t(62) = 2.74$, $p = .01$, $d = 0.69$, with a medium-to-large effect size. Similarly, the EG outperformed the CG in *Language Use*, suggesting a meaningful positive trend with a moderate effect size ($M = 1.82$ vs. $M = 0.74$; $t(62) = 2.57$, $p = .013$, $d = 0.64$), although the result did not reach the Bonferroni-adjusted significance threshold (i.e., $p < .01$). The EG showed numerically higher, but small and non-significant, advantages in *Paraphrase (Quantity)* ($p = .663$, $d = 0.11$) and *Paraphrase (Quality)* ($p = .602$, $d = 0.13$). However, the group exhibited slightly lower gains in *Content* ($M = 1.15$ vs. $M = 1.29$), which were not statistically significant ($p = .721$, $d = –0.09$), reflecting a negligible difference.

Table 8. *Independent Samples t-Test Results Comparing Gain Scores by Rubric Dimension*

| Dimension | Mean gain (EG) | Mean gain (CG) | *t*-value | *p*-value (2-sided) | Cohen's *d* |
|---|---|---|---|---|---|
| Content | +1.15 | +1.29 | -0.36 | 0.721 | -0.09 |
| Paraphrase (quantity) | +1.24 | +1.06 | 0.44 | 0.663 | 0.11 |
| Paraphrase (quality) | +1.82 | +1.58 | 0.53 | 0.602 | 0.13 |
| Language use | +1.82 | +0.74 | 2.57 | 0.013 | 0.64 |
| Overall quality | +1.79 | +0.77 | 2.74 | 0.008* | 0.69 |

*Note.* *Significant at $p < .01$ after Bonferroni correction.

## Discussion

The current study operationalized reading-to-write tasks among Sri Lankan tertiary-level ESL learners to explore whether participants who engaged with texts they rated as curiosity-inspiring demonstrated greater improvements in summary writing than those who engaged with incurious texts. While the difference in the overall collated summary writing scores between the experimental and CGs did not reach statistical significance, the findings nonetheless suggest a meaningful trend. Specifically, the curiosity-driven reading condition yielded a small to medium

effect size ($d = 0.33$) for the combined score across all five rubric dimensions, indicating modest but notable gains in overall performance. Importantly, when the data were disaggregated by rubric dimension, the EG significantly outperformed the CG in the *Overall Quality* dimension ($p < .001$, $d = 0.69$), even after applying the Bonferroni-adjusted significance threshold of $p < .01$. Additionally, the *Language Use* dimension showed a positive trend favouring the EG ($p = .013$, $d = 0.64$), though this result fell just short of the adjusted significance level. It is plausible that a longer intervention period would have allowed participants more time to engage deeply with the curiosity-driven tasks, potentially yielding larger effects. In educational contexts, even small improvements can accumulate over time or lead to broader impacts (Kraft, 2020), and pure reliance on a conventional value threshold may not necessarily reflect the practical significance of a given intervention (Cohen, 1994), particularly for skills like writing that develop incrementally (Nation, 2009).

The significant improvements observed between the pre-test and post-test for both groups indicate the general effectiveness of the approach applied in this research, with the generally larger improvements seen in the treatment group suggesting the potential value of curiosity-based reading as a component of this method. Given learner performance across the five rubric dimensions, the EG's significant improvement in *Overall Quality* may be seen as a strong indication of enhanced holistic writing performance supported by curiosity-driven texts. Moreover, the EG's near-significant result in *Language Use*, accompanied by a moderate effect size, suggests a promising trend that warrants attention and should not be overlooked. In sum, integrating curiosity-driven approaches to text selection and reading tasks may hold promise as a pedagogical strategy and warrants further investigation into both the long-term effects and the optimal duration of such interventions.

The small, but arguably meaningful improvement, in summary writing among learners engaged with text they categorised as curious has broad significance given the noted issues of the Sri Lankan university ESL context. The severe paucity of relevant and inspiring lesson materials, including reading texts, is a major criticism levelled against English language teaching departments (Attanayake, 2017; Gunawardane et al., 2021; Savarimuttu, 2019), even resulting in attrition among university students (Canagarajah, 2002). Prescribing reading texts that are seemingly irrelevant can inflict a detrimental effect upon learner engagement in the university classroom. The severity of this situation becomes even more evident when students' attendance is observed to improve only when attendance is made compulsory as a requirement to face examinations (Gunawardane, 2018; Senarathne & Abeywickrama, 2024). This shows the extent to which extrinsically motivated Sri Lankan university ESL learners attempt to satisfy practical needs with a sense of obligation, placing instrumental value upon learning English (Grigorescu, 2021; Kumarage, 2016) rather than learning the language because of an intrinsically motivated drive (Senarathne & Abeywickrama, 2024). With the positive effect of curiosity-based reading on the summary writing observed in the current study, we contend that reading materials aligned with undergraduate learners' curiosity are likely to be a primary step in stimulating learners' curiosity towards learning English out of intrinsic motivation.

The consistent statistical non-significance observed across most rubric dimensions between the treatment and CGs underscores the complex dynamics of curiosity in the Sri Lankan university ESL context. While the intervention was designed under the assumption that learners' initial categorization of texts as "curious" or "incurious" would remain stable, discussions with

participants revealed that this perception was more fluid than anticipated. Some students in the CG reported that texts they initially deemed "incurious" began to pique their interest as they read further. For instance, one participant noted:

> I think most of the articles I received are science-based articles that have some connection with science at the end. First, I didn't like reading them. Later, I felt that there is something that makes me curious, and it gave me some pleasure. It's a different sensation I can't explain.

This suggests that the design of the intervention itself—incorporating contemporary, concise, and contextually relevant online texts—may have been inherently more engaging compared to the traditional reading materials typically encountered by Sri Lankan students, which are often described as overly technical, outdated, and uninspiring. The apparent fluctuation of curiosity, particularly in a positive direction, is a key finding of the current study, suggesting that curiosity is an inherently dynamic phenomenon. This situation further indicates how contextually appropriate reading materials shape learners' curiosity, indicating that such a positive fluctuation may have contributed to enhanced learner agency and engagement in summary writing tasks. This understanding positions curiosity as a modifiable motivational element among learners (Abdelghani et al., 2022), highlighting the potential for teaching and learning strategies that are likely to nurture curiosity in L2 classrooms.

Curiosity-driven reading materials are beneficial not only for engaging learners in the reading process but also for enhancing related tasks, such as writing (Schiefele et al., 2012). Positive appraisal, which fosters epistemic curiosity, plays a key role here; when learners perceive content as personally relevant and valuable, their motivation to engage deeply with the material increases (Nakamura et al., 2022). Allowing learners the autonomy to select what they read further contributes to intrinsic motivation (Deci & Ryan, 1985), reducing the need for teacher enforcement and fostering sustained enthusiasm. This autonomy also lays the groundwork for peer-to-peer learning and reinforces learners' sense of achievement, which can further amplify intrinsic motivation. We argue that such a curiosity-driven, learner-centered approach holds promise for creating more engaging, motivating, and effective language learning environments, ultimately encouraging deeper and more meaningful learning (Grigorescu, 2020; Ostroff, 2016). Enhanced learner agency and motivation are also likely to result in more positive attitudes toward learning English (Ratwatte, 2012).

## Conclusion

This study has several limitations, the identification of which may inform and strengthen future research. One notable limitation was the absence of a true CG: a group of participants who received no intervention at all. Due to ethical considerations, all participants were provided with an equivalent form of educational intervention, as a withholding instruction was deemed inappropriate in the given context. However, a comparison between gain scores in the EG and those of a true CG may arguably have resulted in a difference in mean performance of greater magnitude. Similarly, extending the intervention duration beyond six weeks might allow for more substantial impacts, as language learning often requires longer-term engagement. Additionally, the relatively small sample size ($n$ = 64) may have been insufficient to detect statistically significant effects (Cohen, 1990), which could limit the generalizability of the

findings of the current study. Larger and more representative sample sizes in future research could increase the power of the study and the likelihood of detecting meaningful differences to confirm these findings and further validate the design (Kraft, 2020). Exploring alternative intervention strategies, such as increasing the intensity of the intervention, could also yield outcomes of greater effect. As evidenced in the current study, a learner's orientation of curiosity towards a text does not appear to be a fixed trait over time. Exploring curiosity-related phenomena through qualitative approaches, such as interviews or focus groups, could yield valuable insights into how learners engage with texts and how their curiosity evolves over time. Additionally, investigating whether sustained or shifting curiosity levels differentially affect writing performance could be a fruitful avenue for future research. Replication studies in different contexts will help verify and generalize these findings, further contributing to the understanding of curiosity-driven educational interventions.

The findings are highly meaningful to the Sri Lankan university ESL context and indicate several important implications for theory, practice, and policy in language teaching and learning. Given that a curiosity-based approach holds strong potential for enhancing learning, memory, and motivation, we encourage ESL teachers to incorporate curiosity-inspiring reading materials, particularly news articles, into instruction and perform related tasks such as writing based on them. While its implementation requires thoughtful preparation, experienced teachers' qualitative judgment is often sufficient to select texts aligned with learners' curiosity-based reading preferences. This approach may be especially effective during an intensive English course typically conducted in orientation programmes of higher educational contexts. During this period, with less attention to instrumental goals of L2 learning, learners are freer to engage with English for its own sake with greater autonomy, competence, and relatedness—key psychological needs for intrinsic motivation (Deci & Ryan, 1985). Encouraging students to read freely available online news articles outside the classroom may further help them explore curious topics, contributing to intrinsic motivation and sustained engagement. We suggest ESL teachers experiment with the potential of curiosity-inspiring tasks to enhance other language skills as well, which could bring about promising outcomes for both L2 learners and teachers alike. We hope this study will pique the curiosity of ESL practitioners, both within Sri Lanka and beyond, and invite them to incorporate such approaches in their respective L2 contexts. We also hope this work encourages ongoing explorations of the construct of curiosity in L2 learning, especially in contexts where language learners' intrinsic motivation is inadequate.

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**About the Authors**

Ruwan Gunawardane (corresponding author) is a Senior Lecturer in the Department of English Language Teaching at the University of Ruhuna, Sri Lanka. He is currently pursuing his PhD at the School of Education, University of New England, Australia. His primary research interest lies in curiosity-based ESL instruction, with a particular focus on enhancing learners' intrinsic

motivation towards language learning. Email: rgunawar@myune.edu.au / ruwan@eltu.ruh.ac.lk
ORCID ID: https://orcid.org/0009-0000-3909-5172

Joshua Matthews (PhD) is the Head of Department at the School of Education, University of New England, Australia, where he supervises PhD students and conducts research. Josh's research interests include language teaching, L2 listening, L2 vocabulary, CALL, and language testing. An overview of his previous research outputs can be found at https://scholar.google.com.au/citations?user=zxmE25QAAAAJ&hl=en
Email: jmatth28@une.edu.au ORCID ID: https://orcid.org/0000-0002-2260-2331